

reaction chamber where the carbon molecules from the gas can attach to the catalytic particles causing growth of these to a pre-set size that can be mechanically trapped.

6. (New) A method as claimed in claim 5 characterised by crushing a controlled amount of precipitated carbon and returning the crushed carbon to the reaction chamber in a continuous process for maintenance of an optimum balance with regard to the amount and size distribution of carbon particles.

7. (New) A method as claimed in claim 5 comprising heating said reaction chamber using excess heat from another high temperature process.

8. (New) A method as claimed in claim 5 comprising heating said reaction chamber to a temperature of between 300 and 2000°C.

9. (New) A method of pyrolysis of an organic gas comprising passing said gas through a heated reaction chamber containing carbon dust such that carbon from said gas is caused to precipitate onto said carbon dust.

10. (New) Apparatus for producing hydrogen and carbon in a closed process by pyrolysis of an organic gas utilising carbon dust as a catalyst for precipitation of carbon, said apparatus containing a thermally insulated reaction chamber containing said carbon dust; a heater for heating said reaction chamber and a passage for passing said gas through the reaction chamber.

11. (New) Apparatus as claimed in claim 10 comprising a temperature controller for controlling the temperature of said reaction chamber.

12. (New) Apparatus as claimed in claim 10 comprising a heat exchanger for transferring heat from gas exiting said reaction chamber to gas entering the reaction chamber.

13. (New) Apparatus as claimed in claim 10 comprising a crusher for crushing precipitated carbon from the reaction chamber and returning a proportion of said crushed carbon to the reaction chamber.

14. (New) A vehicle comprising a polymer fuel cell for generating electrical power for propulsion of the vehicle, characterised in that the vehicle further comprises an apparatus as claimed in claim 10 for generating hydrogen fuel for said fuel cell.

15. (New) The application of compact pyrolysis systems in vehicles for pre-processing of natural gas, methane and other organic gases with the aim of producing hydrogen fuel for the polymer fuel cells that generates electrical power for propulsion of the vehicle.

16. (New) A method as claimed in claim 6 comprising heating said reaction chamber using excess heat from another high temperature process.

17. (New) Apparatus as claimed in claim 11 comprising a temperature controller for controlling the temperature of said reaction chamber.